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HW-27337

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This document consists of 20 pages,

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January 29, 1953

To File

UNCONFINED UNDERGROUND RADIOACTIVE WASTE AND CONTAMINATION

The purpose of this report is to document the present knowledge about locations in the 100 Areas where radioactive material has been discharged to ground. Despite efforts to make this report complete, some information may have been overlooked. It is requested that additional pertinent data concerning the locations listed or other locations which have been omitted be forwarded to the Staff Engineer, Graphical Index, Radiological Sciences Department.

The report has been broken down into two classifications - planned and unplanned disposal. Planned disposal includes cribs, solid waste burial grounds, trenches, etc. Unplanned disposal includes locations where radioactive material was discharged to ground due to leaks in piping, retention basins, etc.

Revisions to this report will be issued as warranted by the receipt of information on any new or old disposal areas.

Classification Cancelled (Change to
UNCLASSIFIED
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100-B AREA

PLANNED DISPOSAL

1. 107-B LIQUID WASTE DISPOSAL TRENCH NO. 1

This trench is located immediately north of the 107-B retention basin. It was dug in the spring of 1948 for the purpose of burying sludge that had accumulated in the 107 basin. There is no data available as to the total amount of activity buried. It was covered over in the spring of 1948 with approximately six feet of soil and is marked above ground with a wooden fence posted with radiation zone signs.

2. 107-B LIQUID WASTE DISPOSAL TRENCH NO. 2

This uncovered trench was dug in 1950 to act as a french drain(1) for the effluent water from the 105-B building during a shutdown due to a ruptured slug. It is marked above ground by a dike posted with radiation zone signs. Water, contaminated with an estimated 75 curies(2) of fission products liberated as a result of 54 ruptured slugs, was discharged to this trench.

3. 107-C TRENCH

This trench was dug in 1952 and has not been used to date.

4. 108-B CRIB

This crib was dug in 1950 for disposal of liquid tritium wastes. Only wastes with an activity density of less than 1 μc/cc of tritium was discharged to this crib. No records are available of the total activity discharged here, however all samples of waste analyzed were below the maximum permissible limits for drinking water. This crib is marked above ground with a wooden fence posted with radiation zone signs.

5. 105-B PLUTO CRIB

This crib was dug in the early part of 1951 to receive water drained from a tube containing a ruptured slug and has since been covered over with ten feet of soil. A small pipe was left sticking up through the center for access to the crib. Water, contaminated with an estimated 140 curies of fission products liberated as a result of 7 ruptured slugs, was discharged to this crib. Although it is still possible to use this crib nothing has been discharged to it since early in 1952. This crib is marked above ground with a wooden fence posted with radiation zone signs.

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(1) In this report a french drain refers to an excavation that has been partly or completely filled with coarse gravel that permits rapid seepage of any liquid discharged to the surface of the gravel.

(2) All estimates for curies of fission product were calculated on the basis of an unpublished report by R. N. Donelson dated 6-3-52 and entitled, "An Evaluation of the Gross Fission Products Liberated in the Pile Areas As A Result of Ruptured Slugs Through 1951". All estimates include the affect of ruptured slugs through 1952.

6. 105-B STORAGE BASIN TRENCH

This trench was dug in 1946 after a slug was accidentally cut in half in the storage basin. The basin was cleaned by draining the water into this trench which was then covered over with six feet of soil. The total activity buried here is unknown. The location is marked above ground with a wooden fence posted with radiation zone and do not excavate signs.

7. 111-B CRIB

This crib was built in early 1951 to receive radioactive wastes from the 111-B building. It is a french drain that has been covered with approximately six feet of soil. No information is available as to total activity discharged here. This area is marked above ground with a wooden fence posted with radiation zone signs.

8. 105-C CRIB

This crib was dug in 1952 and has not been used to date.

9. OPERATIONS SOLID WASTE BURIAL GROUND

The first trench in this burial ground was dug in 1944. Six trenches have been used and covered with approximately six feet of soil and a monument posted at both ends. The concrete monuments are capped with a brass plate with the lettering "do not excavate". At present, there are three open trenches side by side with their long axes running east and west. Total activity buried here is not known. The area including all trenches is surrounded by a wire fence posted with radiation zone signs and is kept locked when not in use.

10. 108-B SOLID WASTE BURIAL GROUND

The first trench in this burial ground was dug in early 1950 and used as a burial ground for solid tritium wastes and high level liquid tritium wastes sealed in 3" diameter iron pipe. Later, in 1952, it was used to dispose of contaminated tritium pots and also irradiated process tubing. One trench is filled and covered with six feet of soil and the other containing similar material is open and is used occasionally. An area including both trenches is surrounded by a wire fence posted with radiation zone signs and is kept locked when not in use.

11. BALL 3-X BURIAL GROUND

Highly contaminated wastes such as old thimbles, step-plugs, etc. that were removed from the 105-B pile during the ball 3-X shutdown in January, 1953 are buried just outside the 105-B exclusion area fence. The hole is still open at the time of this writing but is to be covered over with four or five feet of soil and posted with concrete monuments. At the present time it is enclosed within a roped off area posted with radiation zone signs.

UNPLANNED DISPOSAL

1. LEAKS FROM 107-B RETENTION BASIN

The leaks from this basin were greatest on the northeast side of the basin. There were also several leaks in the pipe on the outlet end of the basin. The leaks were not covered but were fenced off on three sides of the basin and posted with radiation zone signs. The leaks on the south side of the basin have not been included within a radiation zone. For more detailed information see attached sketch "A".

2. LEAKS FROM THE EFFLUENT LINE NEAR THE 107-B RETENTION BASIN

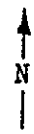
The first indications of gross leaks in the basin area from the effluent line from 105-B to 107-B were observed in early 1952 and they steadily increased in volume. No attempt to cover this contaminated area has been made to date. The entire area of leakage is roped off and posted with radiation zone signs. For more detailed information see attached sketch "B".

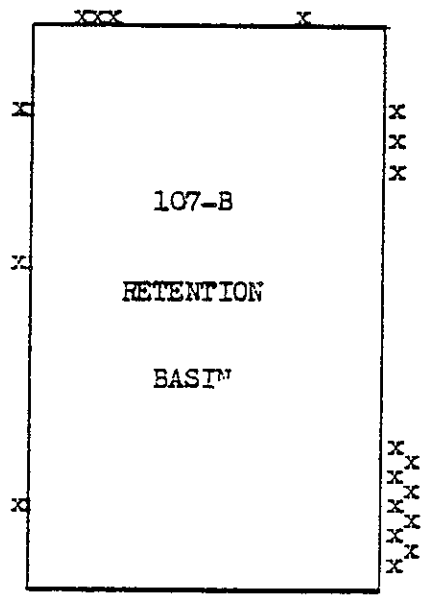
3. LEAKS FROM THE EFFLUENT LINE INSIDE 105-B EXCLUSION AREA

The two known leaks in this area from the effluent line from 105-B to 107-B occurred during the last half of 1952. One was near the #2 diversion box for the 30" line and the other was around the 8" riser for the temporary by-pass line northeast of the 105-B building. In both places the contaminated area has been covered with at least three feet of soil. Neither location is marked in any way above ground. For more detailed information see attached sketch "C".

100-B AREA

11-12-52



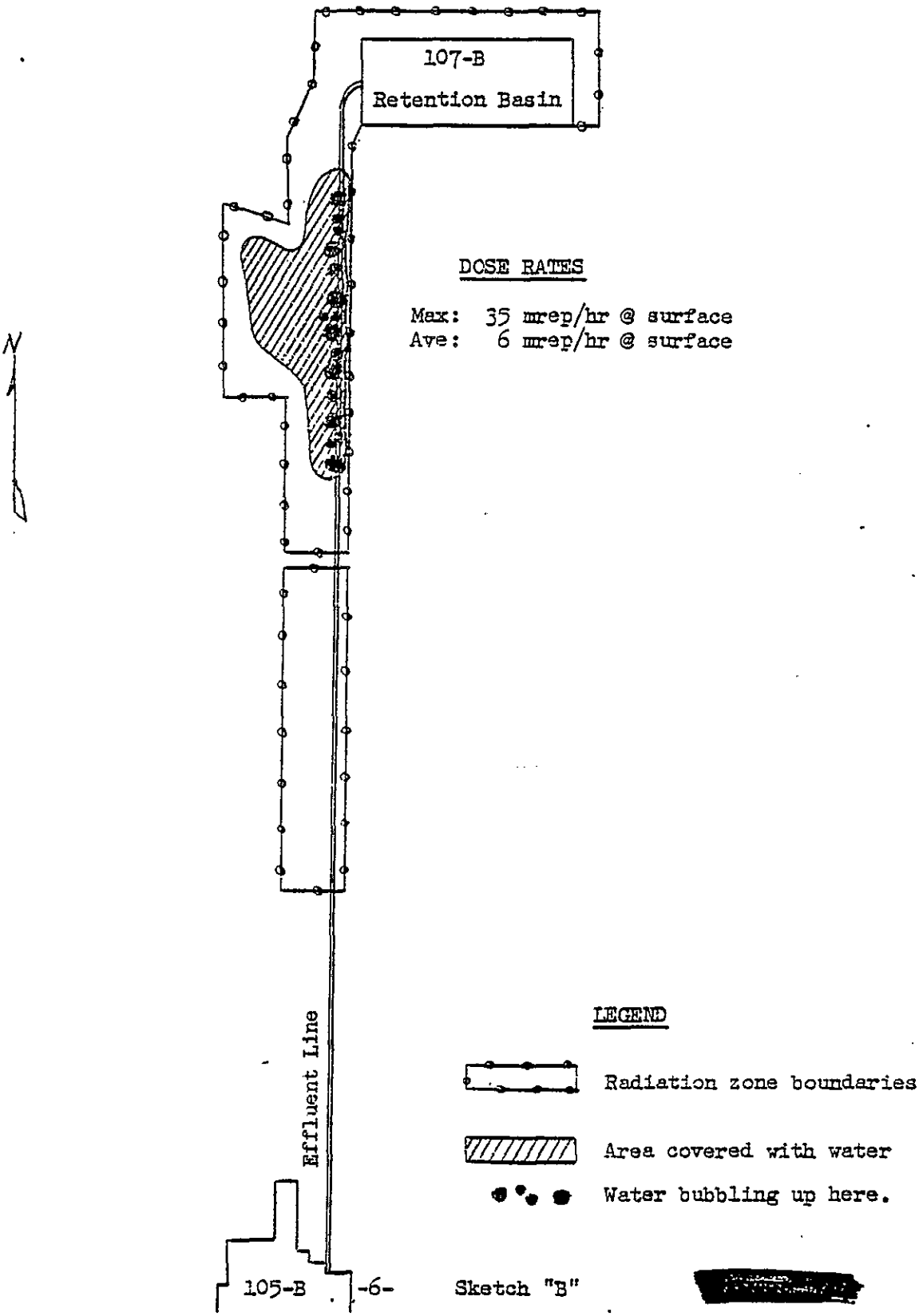


Most of the above leaks could be classed as seepage.
Approximate location of small leaks shown by a small "x".

Sketch "A"

100-B AREA

9-19-52



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Sketch "B"

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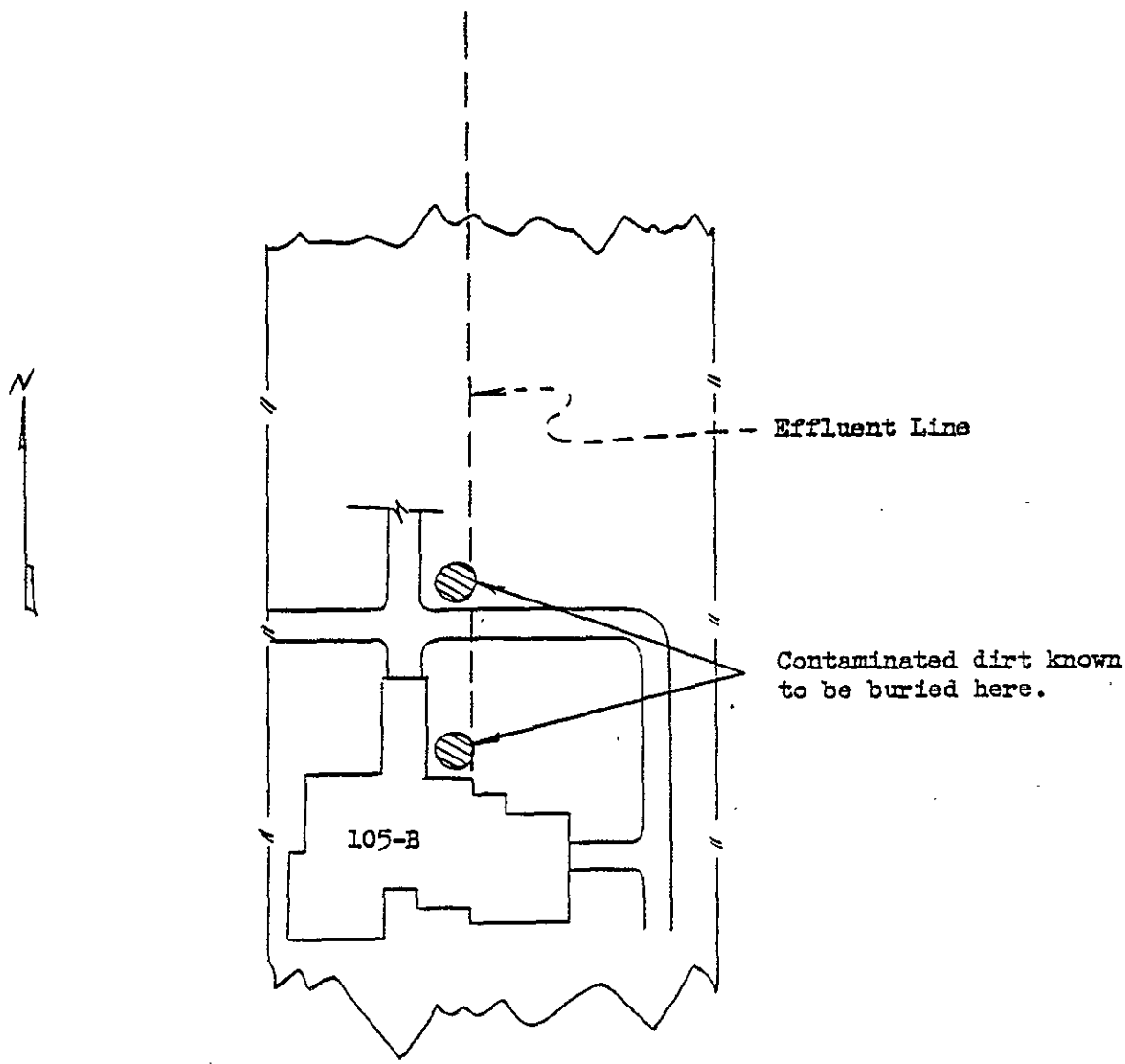
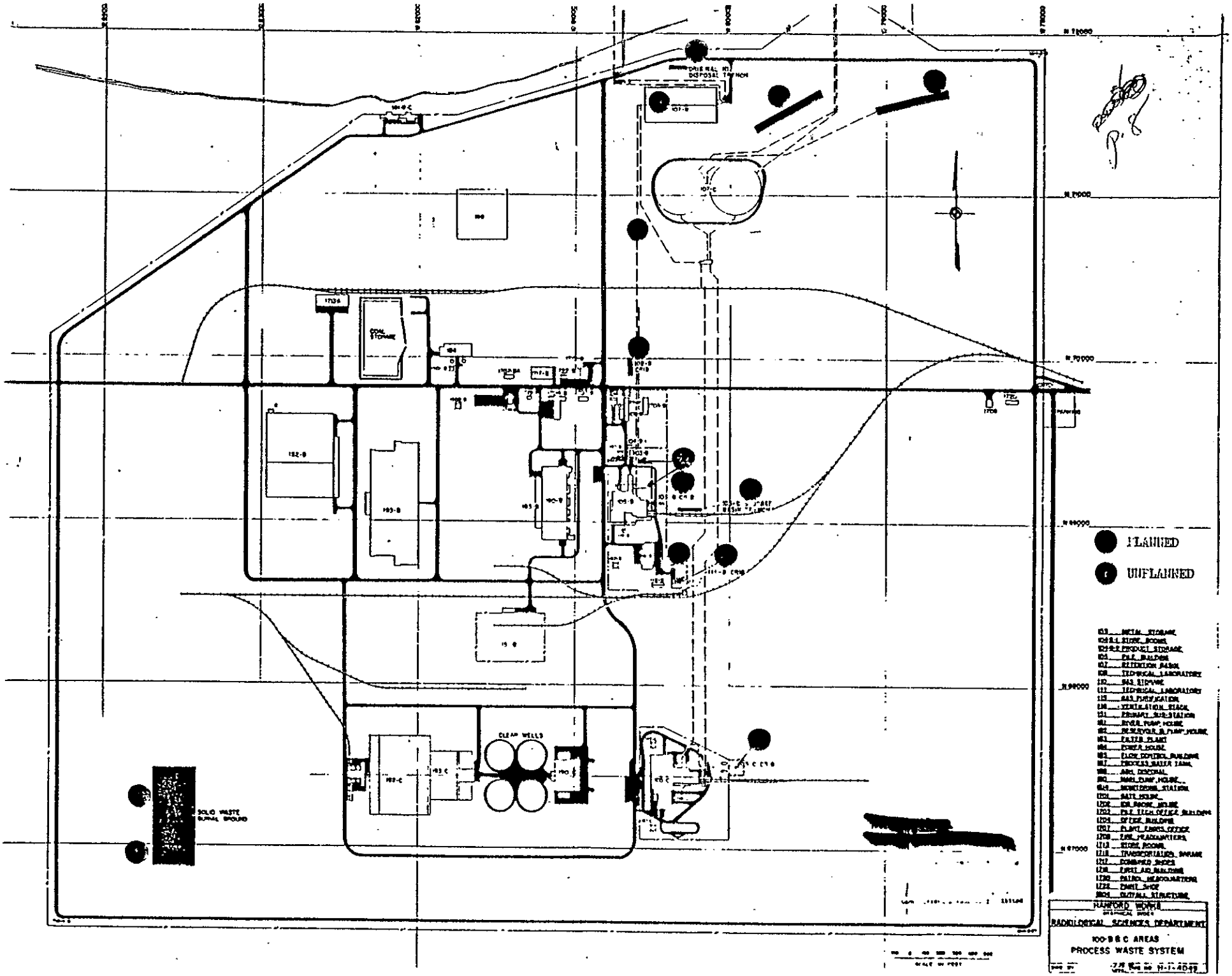
11-11-52

100-B AREA



OLD EFFLUENT LINE LEAKAGE

Sketch "C"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UNPLANNED
HANFORD WORKS
RADIOLOGICAL SCIENCES DEPARTMENT
100-B & C AREAS
PROCESS WASTE SYSTEM

100-D AREA

PLANNED DISPOSAL

1. 107-DR LIQUID WASTE DISPOSAL TRENCH NO. 1

This open trench was dug in 1950 and has been used for receiving the effluent water from either the 105-D or the 105-DR pile building when either has a ruptured slug. Water, contaminated with an estimated 110 curies of fission products liberated as a result of 79 ruptured slugs, was discharged to this trench. There is no fence around this trench, however, there is a dike encircling it with radiation zone signs posted about 100 feet apart.

2. 107-DR LIQUID WASTE DISPOSAL TRENCH NO. 2

During the repair of the leakage at the inlet end of the 107-DR basin in the fall of 1952, it was necessary to drain the effluent water from the job site. Accordingly a trench was dug from the inlet end of the DR basin towards the SE corner of the D basin. On completion of the job the trench was backfilled with approximately four feet of clean soil. This area is not marked above ground. For location see attached sketch "D".

3. 108-D CRIB

This crib is located about 100 feet directly east of the 108-D building. It is an underground french drain dug in 1951 and covered with about eight feet of soil. To date it has been used for low level fission products wastes from a contaminated maintenance shop and a cask decontamination pad, both of which will be located in the 108-D building. The crib is not marked in any way above the ground.

4. TIE-IN OF THE "D" AND "DR" EFFLUENT LINES BURIAL GROUND

Effluent water lines from the two pile buildings join inside the exclusion area just north of the 105-D and east of the 103-D buildings. At the completion of the tie-in phase of the job in 1950, contaminated soil and pipe were buried here. The material is covered with at least two feet of soil and a removable concrete top. The area is marked above ground with a wooden fence posted with radiation zone signs.

5. 105-D STORAGE BASIN TRENCH

This trench was dug in 1947. It is located east of the 105-D building and immediately north of the railroad tracks. The trench received water and sludge, total activity unknown, from the 105-D storage basin. It is believed to have been covered with six feet of soil. There are no markers to identify the trench above ground.

6. 105-D PLUTO CRIB

This excavation, located east of the 115-D building and near the exclusion fence, was dug in 1950 and was originally intended to receive water from an isolated process tube containing a ruptured slug. This practice has been discontinued, but the crib is still open to access by means of a four inch pipe rising up from the center of the crib. It is believed to be covered by about ten feet of soil. Water, contaminated with an estimated 150 curies of fission products liberated as a result of 6 ruptured slugs, was discharged to this crib. The crib is marked above ground with a wooden fence posted with radiation zone signs.

7. 105-DR CRIB

This crib was dug in 1950 and was used to receive liquid from isolated tubes containing a ruptured slug. It is located in the southeast corner of the exclusion area and is covered with ten feet of soil. Water, contaminated with an estimated 850 curies of fission products liberated as a result of 4 ruptured slugs, was discharged to this crib. The area is marked above ground with a wooden fence posted with radiation zone signs.

8. ORIGINAL SOLID WASTE BURIAL GROUND

The first trench in this burial ground located south of the 105-DR building was dug in 1944. The burial ground was used until 1949 when construction of the 105-DR building made it necessary to start a new burial ground. Since 1949 this original burial ground has been used occasionally for burial of thimbles, rods, etc. Regulated equipment is also stored inside the fenced area. No records were available of the total activity buried there. Four trenches were used and covered with six feet of soil. At present there is one open trench running east and west. An area including all trenches is confined within a wire fence posted with radiation zone signs and is kept locked when not in use.

9. PRESENT SOLID WASTE BURIAL GROUND

This burial ground, located in the southwest corner of the area, was first used in 1949. There is one covered trench and one open trench running east and west. No records were available on the total activity buried here. The trenches are covered with six feet of soil as they are filled with waste and a "Do not excavate" monument is posted at both ends of the trench. An area including all trenches is confined within a wire fence posted with radiation zone signs and is kept locked when not in use.

UNPLANNED DISPOSAL

1. 107-D RETENTION BASIN LEAKS

The greatest leakage occurred in the spring of 1950 on the north side between the basin and the river. Effluent water had drained under the road to the section between the road and the perimeter fence. Readings up to 10,000 c/m at surface were detected. No attempt to cover this contamination has been made to date. The area involved is marked with a rope fence posted with radiation zone signs. For more detailed information see attached sketch "D".

2. UNCONFINED EFFLUENT WATER

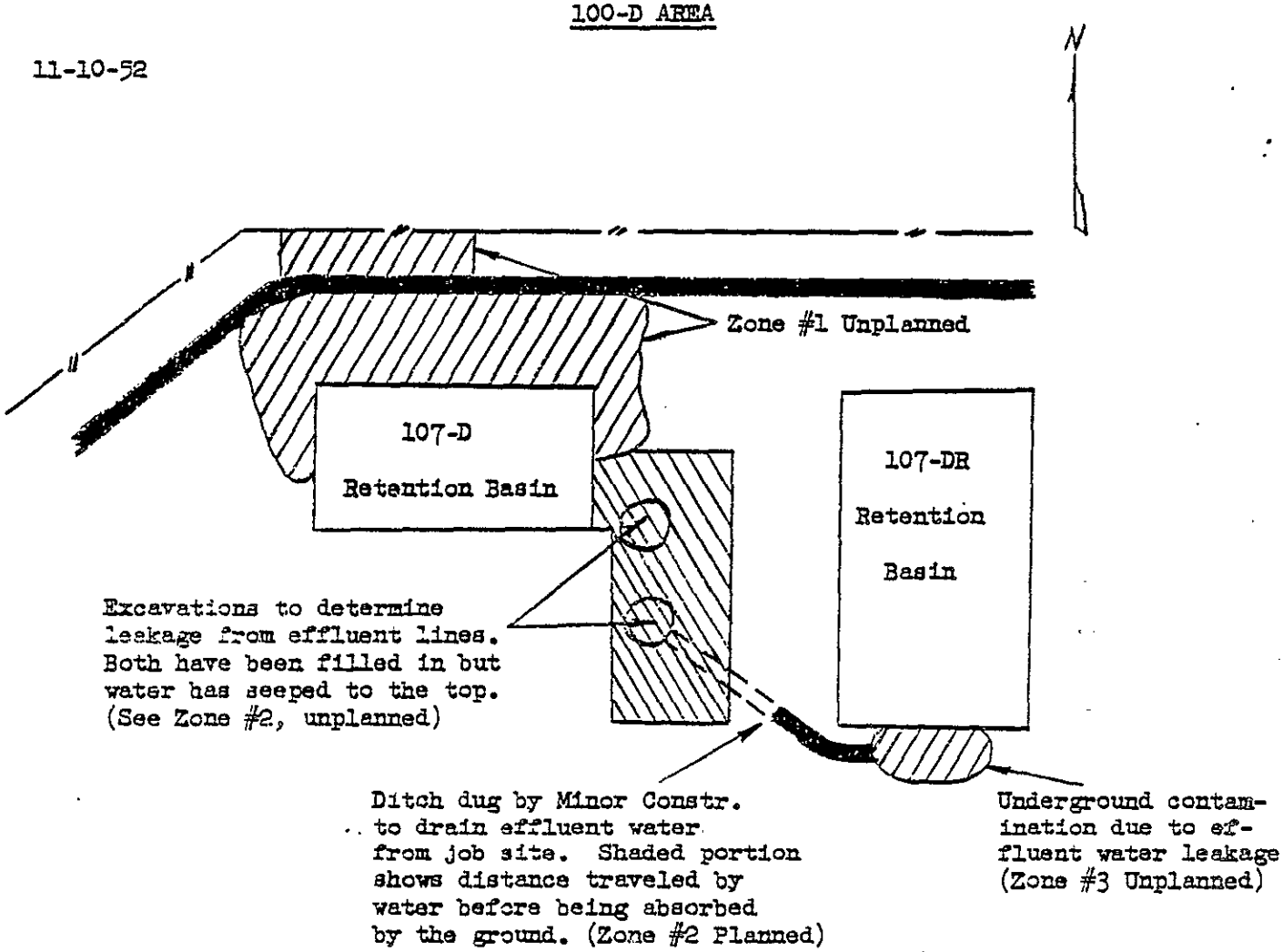
As a result of excessive leakage being detected above ground about 150 feet southeast of the 107-D retention basin, two excavations were made, going down to the pipe level, late in 1951. Maximum dose rate reading observed at that time was 50 mrep/hr at surface. The holes have since been covered but effluent water has seeped to the surface. The area is a radiation zone marked by a rope fence posted with radiation zone signs. For further information see attached sketch "D".

3. 107-DR RETENTION BASIN LEAKS

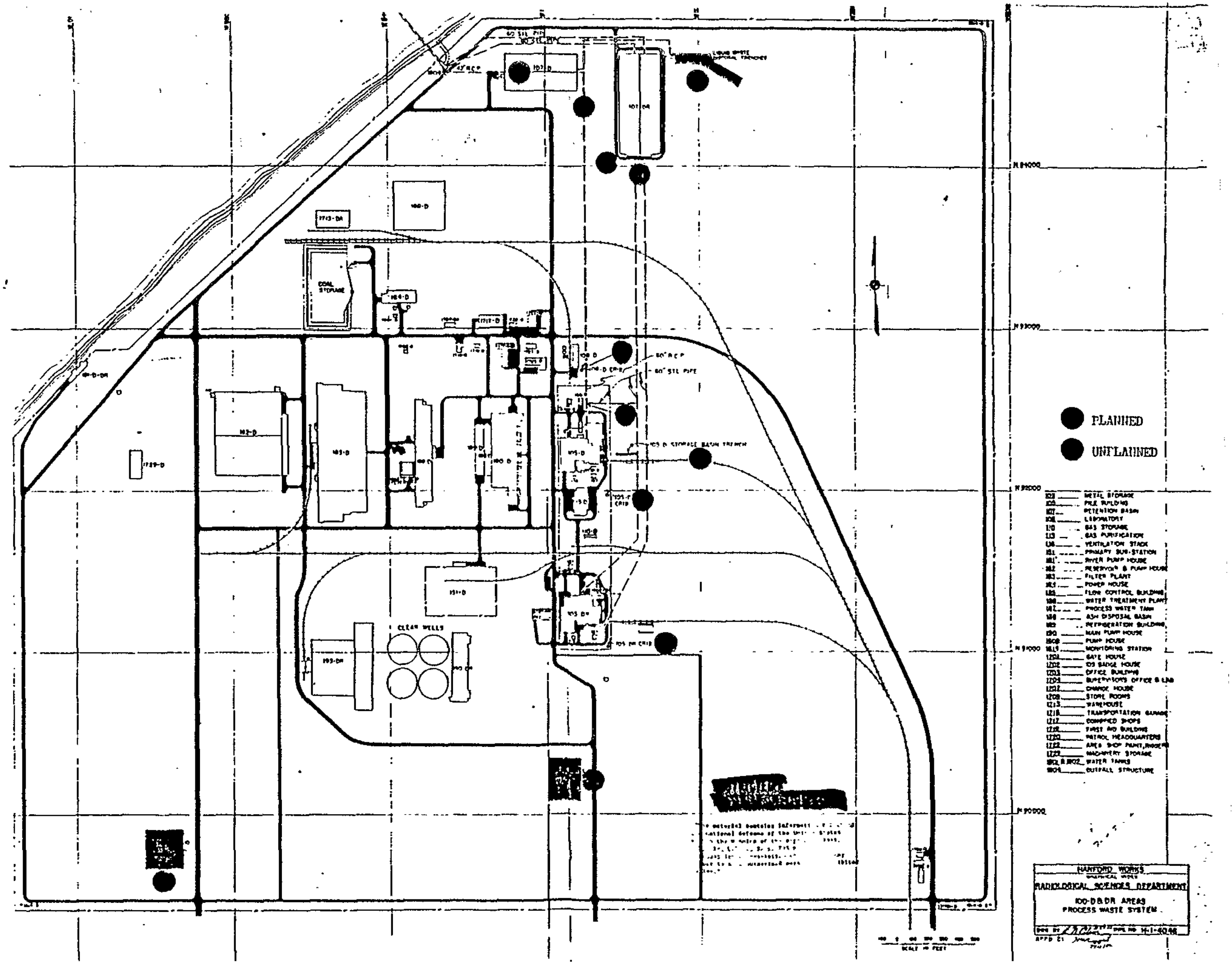
Extensive leakage of effluent water at the inlet end of the 107-DR retention basin was caused by the pipes pulling loose from the basin wall. Readings up to 100 mrep/hr were detected at the surface of the mud. Part of this contaminated soil was used in the fall of 1952 as backfill for the excavation around the anchor blocks south of the 107-DR basin. All contaminated soil was then covered with approximately two feet of clean soil. Most of the contaminated soil is not marked above ground in any way. For further information see attached sketch "D".

100-D AREA

11-10-52



Sketch "D"



PLANNED
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COAL STORAGE
CLEAR WELLS
105-D STORAGE BASIN TRENCH
105 DR CRIB
60" STL PIPE
N 94000
N 93000
N 92000
N 91000
N 90000
103 METAL STORAGE
105 PILE BUILDING
107 RETENTION BASIN
108 LABORATORY
110 GAS STORAGE
115 GAS PURIFICATION
116 VENTILATION STACK
151 PRIMARY SUB-STATION
181 RIVER PUMP HOUSE
182 RESERVOIR & PUMP HOUSE
183 FILTER PLANT
184 POWER HOUSE
185 FLOW CONTROL BUILDING
186 WATER TREATMENT PLANT
187 PROCESS WATER TANK
188 ASH DISPOSAL BASIN
189 REFRIGERATION BUILDING
190 MAIN PUMP HOUSE
1608 PUMP HOUSE
1614 MONITORING STATION
1701 GATE HOUSE
1702 109 BADGE HOUSE
1703 OFFICE BUILDING
1704 SUPERVISORS OFFICE & LAB
1712 CHANGE HOUSE
1708 STORE ROOMS
1713 WAREHOUSE
1715 TRANSPORTATION GARAGE
1717 COMBINED SHOPS
1718 FIRST AID BUILDING
1720 PATROL HEADQUARTERS
1722 AREA SHOP PAINT, RIGGERS
1723 MACHINERY STORAGE
1801 & 1802 WATER TANKS
1904 OUTFALL STRUCTURE
HANFORD WORKS
RADIOLOGICAL SCIENCES DEPARTMENT
100-D & DR AREAS
PROCESS WASTE SYSTEM
DWG NO H-1-4046

100-H AREA

PLANNED DISPOSAL

1. 107-H LIQUID WASTE DISPOSAL TRENCH

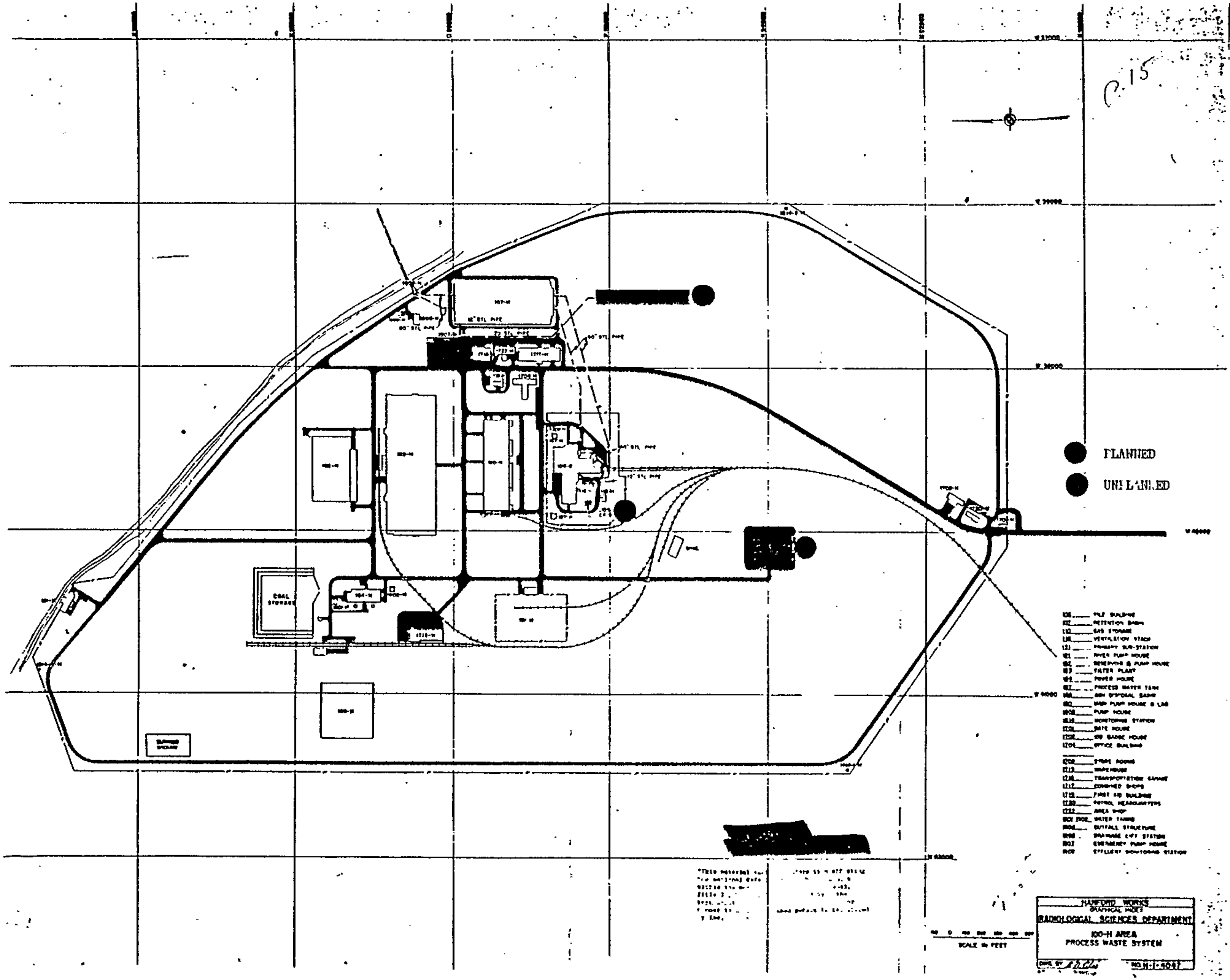
This open trench is located near the 107-H retention basin. The first section was dug in early 1952 and a second section of about the same size was added later in 1952. The water that usually goes to the retention basin is diverted to the trench during a shutdown involving a ruptured slug. Water, contaminated with an estimated 60 curies of fission products liberated as a result of 43 ruptured slugs, was discharged to this trench. This area is designated as a radiation zone with a dike around the trench on which radiation zone signs are posted every 100 feet.

2. 105-H PLUTO CRIB

This crib is used to receive drainage from a tube containing a ruptured slug. The crib was constructed in 1950 and used for only a short time before it was covered over with approximately ten feet of soil. Water, contaminated with an estimated 270 curies of fission products liberated as a result of 10 ruptured slugs was discharged to this crib. The crib has not been used since early in 1952. The area is roped off and posted with radiation zone signs.

3. OPERATIONS SOLID WASTE BURIAL GROUND

The first trench in this burial ground was dug in 1949 and has been used for the disposal of solid dry wastes. As one trench is filled it is covered with six feet of soil and is marked above ground by monuments at both ends of the trench. The original trench is covered and a second trench is now in use. An area including all the trenches is enclosed by a cyclone fence posted with radiation zone signs and is kept locked when not in use.



COAL STORAGE
PLANNED
UNPLANNED
PILE BUILDING
RETENTION BASIN
GAS STORAGE
VENTILATION STACK
PRIMARY SUB-STATION
RIVER PUMP HOUSE
RESERVOIR & PUMP HOUSE
FILTER PLANT
POWER HOUSE
PROCESS WATER TANK
STORE ROOMS
TRANSPORTATION GARAGE
FIRST AID BUILDING
PATROL HEADQUARTERS
AREA SHOP
WATER TANKS
OUTFALL STRUCTURE
EMERGENCY PUMP HOUSE
SCALE IN FEET
HANFORD WORKS
RADIOLOGICAL SCIENCES DEPARTMENT
100-H AREA
PROCESS WASTE SYSTEM
NO. H-1-4047

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100-F AREA

PLANNED DISPOSAL

1. GARDEN NEAR 1705-F BUILDING

   This garden is an experimental plot started in the summer of 1952 by Biology section personnel. The source of contamination is from various levels of effluent water which is used for irrigation. The plot is enclosed with a wire fence posted with radiation zone signs.

2. FRENCH DRAIN NEAR 148-F BUILDING

   This drain, built in 1944 receives the overflow, priming water, etc. from the 148-F pumphouse, which in turn controls the flow of effluent water from the 107-F retention basin to the 146-F fish ponds. The drain is covered and is marked above ground with a wooden fence posted with radiation zone signs.

3. BURIED CONTAMINATED SOIL

   During the tie-in of pipes to the 148-FR pumphouse, a large hole was dug to drain water from the effluent pipe lines while welding was being done. The hole was covered with two feet of dirt. No additional signs were erected as this hole was already inside an established radiation zone.

4. 107-F LIQUID WASTE DISPOSAL TRENCH

   This trench was dug in 1950 and has been in use since as an open french drain for effluent water during a shutdown involving a ruptured slug. Water, contaminated with an estimated 60 curies of fission products liberated as a result of 42 ruptured slugs, was discharged to this trench. This trench is surrounded with a dike posted with radiation zone signs.

5. 108-F FRENCH DRAIN

   This is a drain to receive condensate from the hoods inside the 108-F Biology building. Considerable duct work is exposed and in cold weather some of the condensate flows back down to this drain. To date no activity has been detected in this condensate, but it is possible that contamination from plutonium as well as many beta emitting isotopes could be washed down the walls of the hoods and ductwork in the future.

6. 105-F LIQUID WASTE DISPOSAL TRENCH

   This is a long open trench dug during the latter part of 1952 to hold the water flowing from the 105 building during the extended ball 3-X shutdown. Work is under way to enclose the area within a permanent fence which will be posted with radiation zone signs.

7. 105-F STORAGE BASIN TRENCH

   Excavation date of this trench is uncertain. It was used to receive the effluent water during the time the pile building was down due to one ruptured slug. In addition, all sludge removed from the basin in January, 1951 was discharged to this trench. It was covered over in January 1951 with about eight feet of soil and has not been used since. Water, contaminated with an estimated four curies of fission products, was discharged to this crib. The location is marked above ground by a "Do not excavate" sign at each end of the trench.

8. 105-F PLUTO CRIB

This crib was dug to receive water from process tubes containing a ruptured slug. The original construction date is uncertain, but was probably some time in 1950. Since that date it has been covered with ten to twelve feet of soil. The only access to the crib is by means of a pipe that was left sticking up from the center of the crib. It has not been used since early in 1952, but could be used in the future if so desired. Water, contaminated with an estimated 280 curies of fission products liberated as a result of 8 ruptured slugs, was discharged to this crib. The location of the crib is marked above ground by a wooden fence posted with radiation zone signs.

9. BALL 3-X BURIAL GROUND

Highly contaminated wastes such as old thimbles, step-plugs, etc. that were removed from the 105-F pile during the ball 3-X shutdown in the last half of 1952 were buried just outside the south fence of the 105 exclusion area and covered with an average of five feet of soil. There is no information available as to the total activity buried. The area is marked above ground by concrete monuments which read, "Do not excavate within twenty feet".

10. 115-F CRIB

This crib was dug in 1949 to hold the silica gel removed from the gel tower in one of the 115-F dryer rooms. It was covered at that time with five or six feet of clean soil and has not been disturbed. The location is marked above ground with a wooden fence posted with radiation zone signs.

11. OPERATIONS SOLID WASTE BURIAL GROUND

The burial ground consists of six covered trenches filled with solid, dry wastes and one open trench. The trenches are parallel and as they are filled with waste they are covered with about six feet of soil and marked at each end by a concrete monument. No records were available on the total activity buried. The whole area is surrounded by a wire fence posted with radiation zone signs.

12. 108-F LIQUID WASTE BURIAL GROUND

This burial ground consists of large steel cylindrical sleeves that were buried sometime in 1949. They are used primarily for the disposal of animal carcasses that have been used in experimental work involving plutonium as well as many beta emitting isotopes. Also liquid wastes, including I^{131} and P^{32}, that decayed for at least ten half-life periods, were disposed of here. No record of total activity disposed of is available. The sleeves are covered with a wooden lid and are surrounded by a wooden fence posted with radiation zone signs.

13.. 108-F DRY WASTE BURIAL GROUND

This burial ground is a large open trench located west of the operations burial ground. It was dug in the early part of 1952 and is used for the disposal of solid waste from the 108-F building. No record is kept as to the total activity discharged. An area including the trench is marked above ground with a wooden fence posted with radiation zone signs.

UNPLANNED DISPOSAL

1. EFFLUENT LINE LEAK

A leak in the effluent lines going to the 148-F pumphouse was discovered in the summer of 1952 when enough water had escaped to cause the ground level to become saturated over an extended area. After the pipes were repaired the contaminated soil was returned to the hole up to a foot of the ground level and then covered with clean soil. The location is now marked above ground with a rope fence posted with radiation zone signs.

2. EFFLUENT LINE OVERFLOW

The source of this contamination is a large manhole north of the 107-F retention basin (outlet end). The effluent water had overflowed intermittantly for an extended period before it was stopped. The area around the manhole is marked with a wood fence posted with radiation zone signs.

3. LEAKS FROM THE 107-F RETENTION BASIN

Leaks from the 107-F basin were not too serious from any outward evidence, although small leaks were found on all sides of the basin. The largest leak extended roughly twenty-five feet from the foot of the basin wall. Most of the leaks, which were never covered, are confined inside radiation zones. For more detailed information see attached sketch "E".

H. G. Ruppert bwe

H. G. Ruppert
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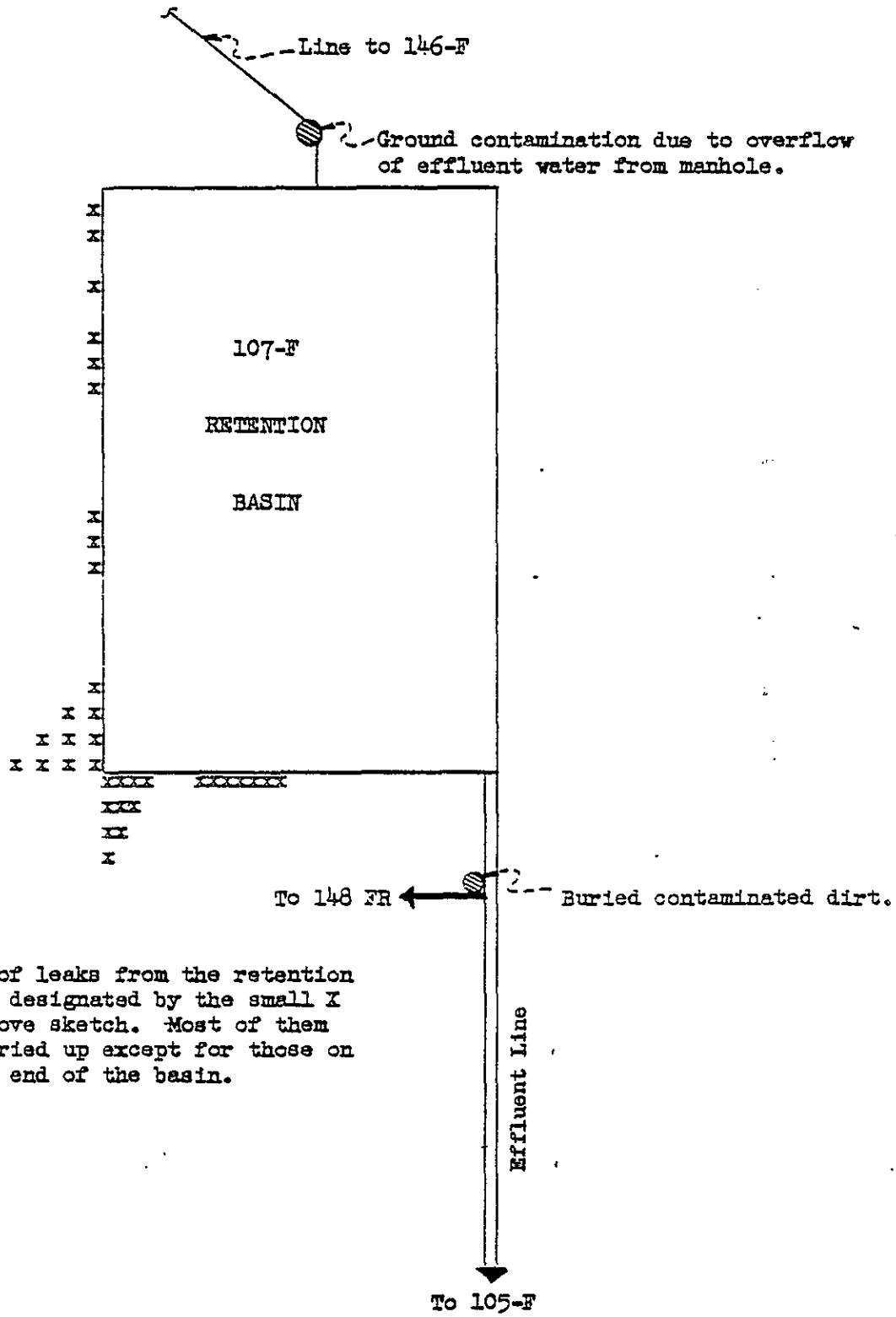
100-F AREA

10-21-52



Location of leaks from the retention basin are designated by the small X in the above sketch. Most of them are now dried up except for those on the south end of the basin.

Sketch "E"

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